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## IN THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US)

International Application No. : PCT/EP00/08312  
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 U.S. Serial No. : 10/070,000  
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 Applicant(s) : HU, Jung-Chih, et al

Title: ELECTROPLATING SOLUTION FOR COPPER ELECTROPLATING

PRELIMINARY AMENDMENT

Commissioner for Patents

Box PCT

Washington, D.C. 20231

Sir:

Prior to calculating the national fee, please amend the above-identified application as follows:

IN THE SPECIFICATION:

Page 27, after paragraph 8, please insert the following:

--Fig 14 Showed the images of pattern wafer before electroplating

Fig 15 The relationship of Cu film resistivity vs. various concentration of HCl ( $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ none at 90 g/l,  $\text{H}_2\text{SO}_4$  at 197 g/l, current density at  $2.4 \text{ A}/\text{dm}^2$  and time at 2 min)

Fig 16 The uniformity at the top of the trench is (a) not smooth without HCl addition (b) more smooth with HCl addition

Fig 17 Voids are obviously formed in the trench without any additive agent addition

Fig 18 The relationship of Cu film resistivity vs. various concentration of  $(\text{NH}_4)_2\text{CS}$ . $(\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$  at 90 g/l,  $\text{H}_2\text{SO}_4$  at 197 g/l, HCl at 70 ppm, current density at  $2.4 \text{ A}/\text{dm}^2$  and time at 2 min)Fig 19 SEM image of the electroplated Cu film at 0.03 g/l of thiourea addition, applied current density is  $2.4 \text{ A}/\text{dm}^2$ .Fig 20 SEM image of the electroplated Cu film at 0.054 g/l of thiourea addition, applied current density was  $2.4 \text{ A}/\text{dm}^2$ Fig 21 The relationship of Cu film resistivity vs. deposition time ( $(\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$  at 90 g/l,  $\text{H}_2\text{SO}_4$  at 197 g/l, HCl at 70 ppm current density at  $1.2 \text{ A}/\text{dm}^2$ )